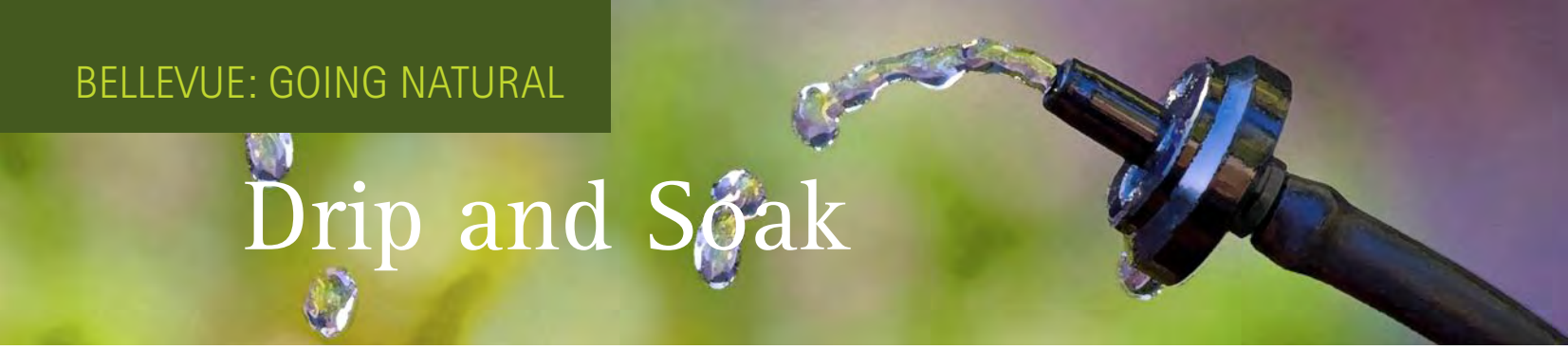
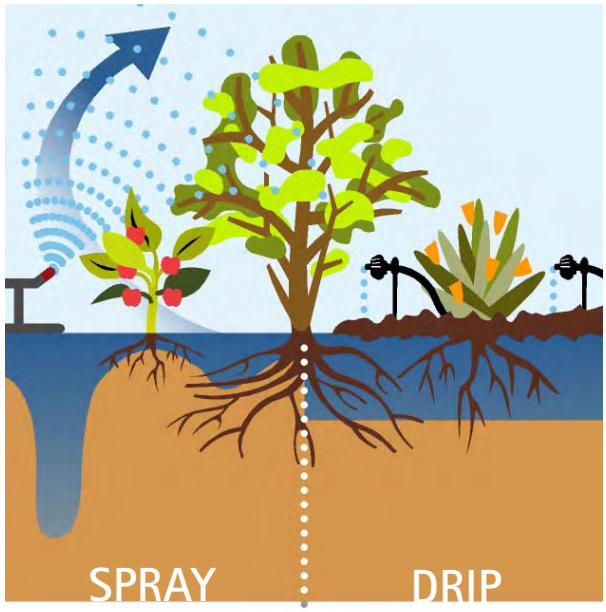


Drip and Soak

Watering with drip irrigation and soaker hoses can help you grow healthier plants using 50% less water than sprinklers, with fewer weeds and less work! How do they do it? By applying water directly into the soil. The benefits include:

- **No waste from runoff and little or no water loss from evaporation and overspray.**
- **Fewer weeds sprouting and competing for water.**
- **Reduced plant disease spread by splashing soil and wet foliage.**
- **No unwatered plants due to foliage blocking sprinklers.**
- **Less time moving hoses and sprinklers, weeding, and fighting diseases.**



20–50% WASTED THROUGH EVAPORATION. UNEVEN WATERING LEAVES SOME SPOTS DRY, WATER BELOW ROOTS IN OTHERS.

100% WATER REACHES ROOT ZONE.

Steps to Save with Drip and Soak

Drip and soaker hoses can help save water in just about any landscape. These steps can help you find a system that's right for your garden:

1. Drip or soak—which meets your needs?
2. How do I plan a drip or soaker irrigation system?
3. How many hoses are needed?
4. How long should I drip or soak?

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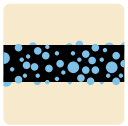
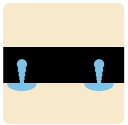
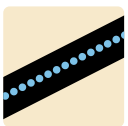
1. Drip or Soak—Which Meets Your Needs?

What is the difference between drip and soaker hoses?

Soaker hoses "sweat" water along their length, applying water directly to the soil without spraying in the air; or on leaves, fences, and pavement. However, soakers waste a lot of water on unplanted areas between plants or beds, or where the hose has been coiled to use up excess. Also, soakers apply much more water near the water source than farther along and at low spots than at higher ones. These limits make soakers best for watering small, level garden areas.

Drip systems apply precise amounts of water through "emitters" and "micro-sprays" inserted into flexible tubing where water is needed. Emitters and sprays can be placed to water individual plants or spaced every 6-18 inches to soak entire beds. Drip systems let you apply water just where plants are without waste in between. Drip emitters also have built-in pressure regulators, so they apply water evenly on slopes and at a distance from the water source. These advantages make drip appropriate for efficient watering of large gardens with varied plantings.

Soaker and Drip Irrigation Systems

Types and Uses	Pros	Cons
 **Soaker hoses** are good for watering small beds on level ground or temporary watering of transplanted shrubs and trees.	Easy to connect to garden hoses. Inexpensive, widely available.	Output varies with elevation and distance from water source. Limit to 100 foot lengths. Water wasted on unplanted areas. Clog or break in 2-4 years.
 **Drip emitters** inserted in flexible tubing are best for watering shrubs and trees planted far apart and for plants in small pots.	Very uniform watering only where water is needed.	Inserting many emitters is difficult. Some types are easily damaged. May need to add emiters as plants grow.
 **Driplines** with emitters pre-installed at regular spaces (typically 12") create a band of moist soil that is useful for dense plantings.	Easy to install. Uniform watering. Emitters cannot be broken off. Durable tubing lasts 10-20 years.	Water wasted between widely spaced plantings.
 **Drip Tapes** have pre-installed emitters like driplines, but thinner tubing is more economical for annual crops or temporary watering of new plantings.	Inexpensive. Easy to install and remove.	Can run only in straight lines. Easily damaged. Often clog or break in 2-4 years.
 **Micro-sprays** are plugged into drip lines to sprinkle individual plants or dense patches of ground covers or annuals.	Easy to install and remove. Good for new plants amid plantings that do not need water.	Watering rates vary. Spray can blow away. Easily damaged.

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2. How Do I Plan a Drip or Soaker Irrigation System?

It's simple to lay a soaker hose on a small garden bed, but planning drip irrigation for a large garden may require help from an irrigation professional. Catalogs available at garden centers or mail order suppliers (see the *Resources* listings at the back of this guide) can help you select the parts you need. The basic steps of planning any system include:

Draw a map of your garden showing the location of plants, beds, and water faucets. A scale of 1 inch representing 4 feet allows space to draw in drip line layouts. Using ¼" graph paper makes it easy.

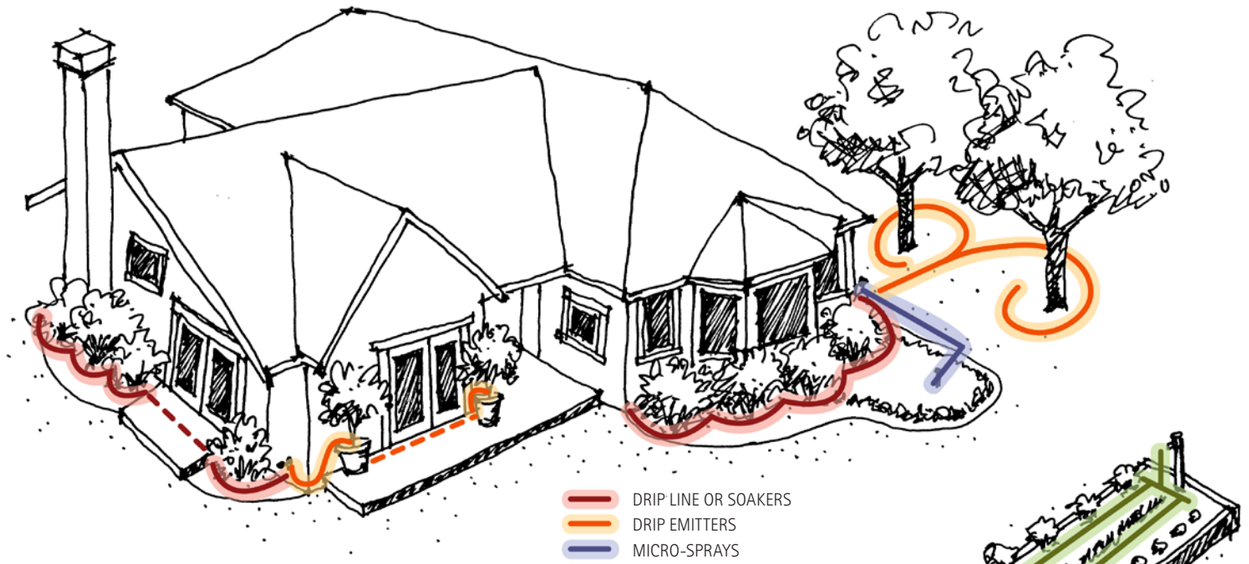
Check the flow rate and pressure of your water source. Everything that uses water in your home (faucets, showers, clothes washer, etc.) must be turned off. Run a fully open garden spigot into a 5-gallon bucket for 30 seconds to find out how many gallons per minute are available—this will tell you how many emitters or feet of soaker hoses can run in a "zone." Use a pressure gauge ($5 at garden centers) to see if the pressure needs to be regulated (see the *What Every System Needs* section in this guide).

Decide how many "zones" are needed and how they will be controlled. Different types of plants (annuals, perennials, shrubs, and trees) and sun exposures should be watered in separate "zones," so schedules can be adjusted to meet their varied needs. The number of zones will also depend on the flow available. Each zone can be turned on and off using manual valves or timers.

Choose equipment suitable for each planting area. Use the charts in this guide for guidance.

Sketch where soaker hoses or drip tubing will be placed in each bed and how it will connect to the source.

Make a list of the parts needed to build the system. For drip systems, include extra tubing, connectors, "goof-plugs," emitters and end fittings for additions and repairs.



3. How Many Hoses?

Ideal spacing of soaker hoses or drip emitters depends on the soil and plant types and plant spacing. Water spreads just 6" from a soaker hose or drip emitter in sandy soil, but a foot or more in clay. To moisten soil 6" below the surface in the entire bed, soaker or drip lines must be 12" apart on sandy soil or 24" on clay soil.

Most plants will do fine if 50% of the root area is moist, so soaker or drip lines may be spaced about twice these distances in perennial and shrub beds or one line per row of annuals (see chart below).

	Space between soaker or drip lines		OR number of emitters	
	CLAY SOIL	SANDY SOIL	CLAY SOIL	SANDY SOIL
	Emitters 12-18" in line	Emitters 6-12" in line		
Shrubs, Trees	4 feet	2 feet	One / 2 feet plant circumference	One / 1 foot plant circumference
Annuals	One soaker or emitter line per row of plants.		One per plant	One per plant
Perennials	One soaker or emitter line per row of plants.		One per plant	One or two per plant

DRIP TIPS

Use high quality parts

that resist clogging and damage. Pressure compensating emitters flush out dirt each time you water. Factory-installed emitters in driplines cannot be accidentally broken off by feet or hoes.

Lay drip lines and soaker hoses under mulch

for protection. Don't bury them in the soil, where they are hard to find and may become clogged or damaged by weeding or tilling.

Lay out drip and soaker tubing in straight or gently curving lines

that come near each plant. They will be easy to locate and expose to prevent damage when transplanting or hoeing. Don't add small "spaghetti" tubing to reach plants—it is easy to damage and hard to find under mulches or groundcovers.

4. How Long Should I Drip or Soak?

(Hint: Not All Night)

Each drip or soaker system is unique, and its schedule should be too. Watering needs depend on plant types and layout, soil, the flow rate and spacing of emitters or soaker hoses, and the weather. The chart below shows some typical watering times for different situations, but the best way to water efficiently is to observe plants and check the soil before and after watering. Refer to the *Watering* guide for more details.

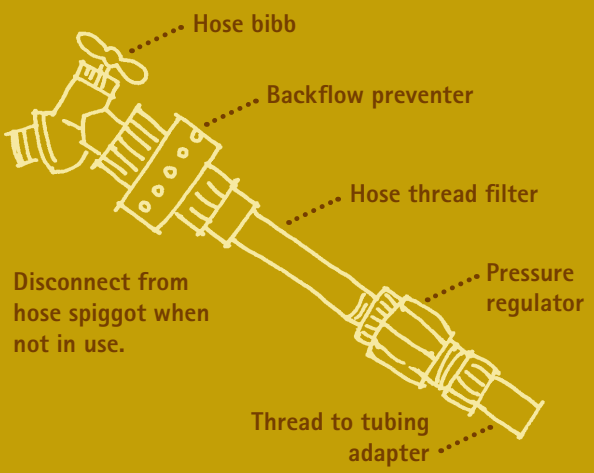
	TYPICAL LAYOUT	WATER NEED	WEEKLY RUN TIME
Shrubs, Trees	Soaker hoses or driplines (one gallon/hour emitter per foot) on lines 2-3 feet apart.	1/3" to 2/3"	45-60 minutes (one day) or 25-30 minutes (two days)
Annuals & Perennials	One 1/2 gallon/hour emitter per foot of crop row.	3/4" to 1" per week	90 minutes (30 minutes three days)
	One soaker hose per crop row.	3/4" to 1" per week	45-60 minutes (25-30 minutes two days or 15-20 minutes three days)

What Every System Needs

Every drip and soaker irrigation system needs a few basic parts where it connects to the water supply to run efficiently and prevent damage to parts.

Backflow preventer. A backflow preventer is recommended for hose spigot systems and required for every permanently connected irrigation system. The device keeps bacteria or chemicals from accidentally entering drinking water. Inexpensive ($5-10) vacuum breakers work for a single irrigation zone or spigot. Multi-zone systems need a brass backflow device that is usually installed by a plumber. Call Bellevue Utilities at 425-452-2030 for the City's installation and inspection requirements.

Filter. A filter is essential to remove debris that can clog drip emitters. Filters for most home systems cost $5 to $25, depending on the landscape size and water quality.



Pressure reducer. A pressure reducer should be installed on every soaker hose to regulate flow and prevent bursts. Drip systems may need regulators if pressure is too high for emitters to work properly or for fittings to hold together. Drip tapes and soakers need 10 p.s.i. (pounds per square inch) regulators. Most drip emitters need 20-70 p.s.i. Plastic reducers can be used to regulate pressures under 85 p.s.i. Higher pressures should be reduced at the water meter.

Some Common Questions About Drip and Soak

Can I install my own drip or soaker system? Yes, drip irrigation and soaker hoses are easy to layout and install without special tools and can be hooked up to a hose spigot.

Is clogging a problem with drip irrigation? Not if filters and high quality parts are used.

Do drip and soaker lines interfere with garden maintenance? Not if the system is well planned and the gardener knows where the lines are.

Is drip irrigation expensive? Since most drip irrigation can be installed above ground, it can be much cheaper to install than sprinkler systems. Also, a few zones can be used to water large areas—saving money on valves, pipe, and other parts.

Can a sprinkler system be converted to drip irrigation? Yes, sprinkler heads can easily be removed and replaced with drip tubing connections.

Does my drip system need maintenance? Each spring, walk around the garden while the system is running. Watch and listen for breaks or leaks in system. Keep spare parts on hand for repairs. Check and clean the filter as needed. Monitor plants and the system during summer to ensure proper watering.

Do drip systems have to be picked up in the winter. No. To prevent winter damage, make sure all parts drain to emitters at low points in the tubing. In autumn, loosen end caps at low points to let water drain.

RESOURCES

Catalogs for drip irrigation equipment available at home and garden centers have good information on designing and laying out systems. Or request catalogs from mail order suppliers such as Dripworks, 800-522-3747; The Urban Farmer, 800-753-3747; or DIG, 800-322-9146.

Drip Irrigation for Every Garden in Every Climate, by Robert Kourik. (Metamorphic, 1992)

Sunset Sprinkler & Drip Systems: The Right System for Your Yard, Step-by-Step Sprinkler Installation, Building Effective Drip Systems

Bellevue's Natural Lawn and Garden website
www.bellevuewa.gov/natural_lawn_intro.htm

Bellevue's *Natural Gardening Guides*
Composting Food Scraps • *Composting Yard Trimmings* • *Drip and Soak* • *Fertilizer* • *Garden Design* • *Lawn Alternatives* • *Lawns* • *Mulch* • *Pests, Weeds, and Diseases* • *Plant Right* • *Seasonal Calendar* • *Soil* • *Watering*
For copies, visit Bellevue's Natural Lawn and Garden website *(above)* or call Bellevue Utilities at 425-452-6932.

The Garden Hotline
www. gardenhotline.org or 206-633-0224

Natural Yard Care Neighborhoods website
www.naturalyardcare.info

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